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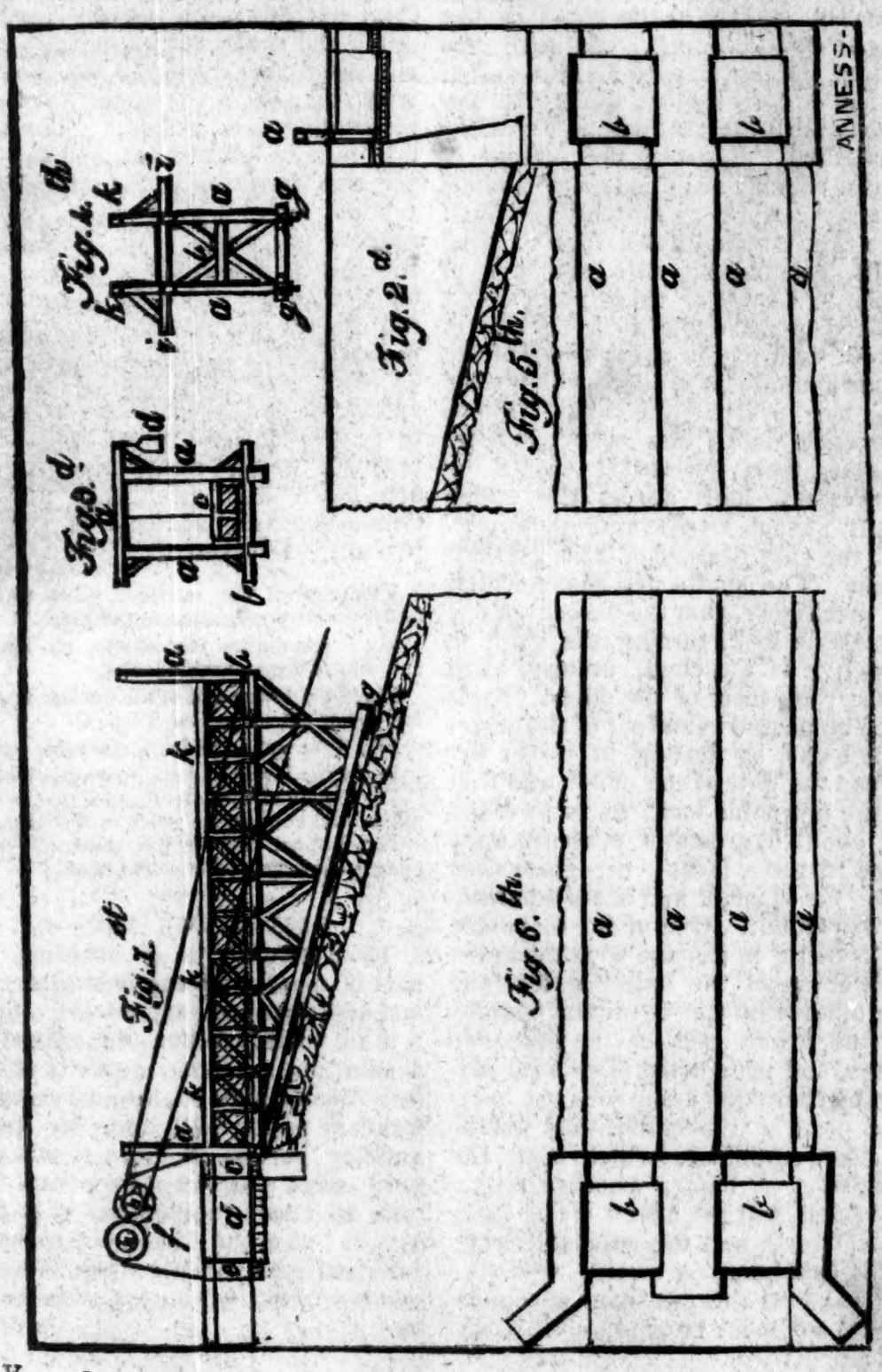
Museum, Register, Journal and Gazette.

Come, bright Improvement! on the car of Time,
And rule the spacious world from clime to clime;
Thy handmaid Arts shall every wild explore,
Trace every wave, and culture every shore.——*Campbell.*

VOL. I.—No. 14.] SATURDAY, MAY 7, 1825. [Price $4 PER ANN.



Description of an apparatus intended to pass boats from one level of an artificial navigation to another, in cases where the want of water, or the height to overcome, would prevent the use of locks.—By James Renwick, *Professor of Natural and Experimental Philosophy, and Chemistry, in Columbia College.*

The ends of the two levels of the canal are closed each by two gates, exactly similar to the gates of the upper end of a lock. Beneath the sill of the lower gate an excavation is made, deep enough to receive the moveable locks, that will be hereafter described. Between the bottom of this a regular slope is laid of timber, dry stone work, or masonry, on which are firmly bolted down four parallel rails, constituting two railways of iron. On each of these railways is placed a moveable lock or car of wood, with a gate at each end, of the same dimensions as those which close the two levels of the canal. These moveable locks are suspended by chains, from horizontal shafts, or windlasses, laid across the upper gates, at such an elevation as to permit the easy passage of boats beneath them. The shafts are so connected by machinery, that the descent of one moveable lock, turning the shaft to which it is attached, around, shall cause the ascent of the other. Boats may be passed in and out of the moveable locks, by letting in water between the gate of the canal, and that of the moveable lock, so as to make an equal hydrostatic pressure upon each of their faces; the gates may then be opened, and boats admitted or drawn out. One of the moveable locks being in contact with the aperture of one of the upper gates, and the other with the alternate opening at the lower end of the intended plane, and both being filled with water, by communication with the adjacent pond of the canal, they will be in exact equilibrio, which state the admission of boats, whether empty or loaded, will not affect. The gates being closed, and the moveable locks being cast loose, no motion will take place while the condition of equilibrium continues to obtain, but if water be permitted to escape from the lower lock, the upper will preponderate, roll down its railway until it reach the lower corresponding gate, and draw the other up into contact with the gate of the upper level, corresponding to its railway. The boats may then be passed out, and the manoeuvre repeated in the opposite direction. By this invention, of the success of which little doubt can remain, in consequence of the high authorities by which its adoption on the Morris cannal has been recommended, the expense of canals may be very materially diminished, the sphere of their usefulness extended, by rendering them practicable in situations where they could not hitherto have been attempted, and the time and consequent cost of navigation much lessened.

The parts of the intended plane may be understood by reference to the plate, where,

Fig 1 represents the shafts, machinery, and one of the moveable locks.

Fig. 2 the lower end of the inclined plane, and lower gates.

Fig. 3 the upper end of a moveable lock.

Fig. 4 the lower end of a moveable lock.

Fig 5 plan of the lower end of the inclined plane, and contiguous gates of the canal.

Fig. 6 upper end of the same, and gates closing the upper level of the canal.

DISTILLERS' LUTE.

Take two parts of whiting, one part of meal, and one fourth of salt, and add the necessary water to make a thick paste. When the apparatus is shut, put a certain quantity of the lute round the head, applied on some strips of paper, and upon the paper another portion of lute; it will dry very soon, and keep very well. It will be easily understood that the salt has no other virtue but to facilitate takiug off the lute when the operation is over, by pouring some water on it. A. D.

PROCESS OF COINING AT THE ROYAL MINT.

(*Continued from No.* 10.)

Fig. 1.

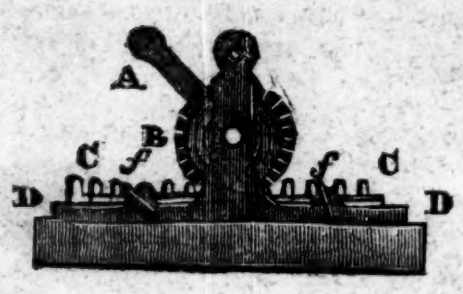


Fig. 2.

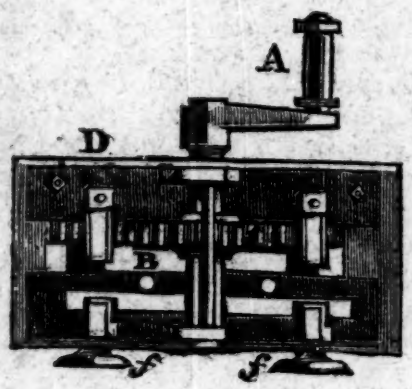
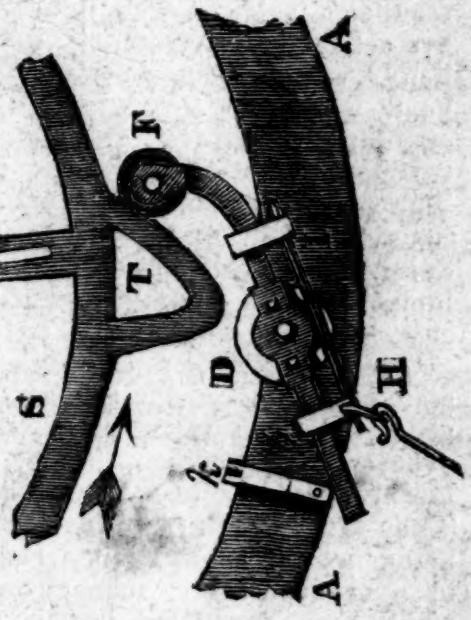
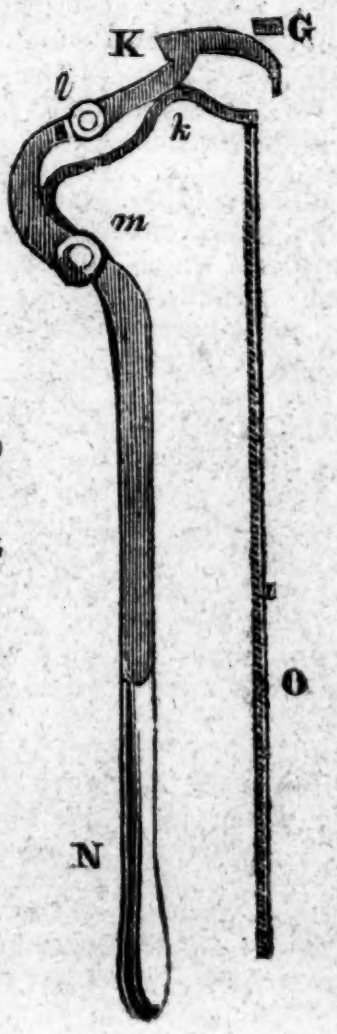


Fig. 3.



ANNESS.

Fig. 4.



PROCESS OF COINING AT THE ROYAL MINT.

The blanks, after being cut out by Bolton's cutting-out press, are carried to the sizing room, where each individual piece is adjusted to its standard weight. The light pieces are selected for remelting, and the heavy ones, if not considerably beyond weight, are reduced to their standard weight by rasping their surfaces with a coarse rasp or file.—The superior accuracy of Mr. Barton's beautiful machine has considerably abridged the labour of this inelegant and unmechanical process.

The pieces thus adjusted are in a state of great hardness, from compression by the rolling and drawing process, and by which, in fact, their latent heat has been squeezed out. They attain their softness again by being heated to a cherry red heat in a reverberatory furnace; after which they are boiled in very weak sulphuric acid, which makes them very clean, and of a very white colour. When dried, either in warm saw dust, or over a very slow fire, they are in a state for the two next processes, which are the milling and the coining or stamping.

The operation of milling is to be performed round the edge, to prevent their being clipped or filed, which was a fraud commonly practised upon the ancient money made before the introduction of milling or lettering round the edge. The construction of the milling machine will be easily understood, from the inspection of the 1st and 2d figures given with the present Number, being an elevation and plan of the same. The parts which operate upon the piece of money, consist of two steel bars or rulers, DD, the adjacent edges of which are cut or fluted; the lower bar, seen in the plan No. 2, is immoveable, being fastened down by two clamps to a cast iron plate, D, forming the base of the whole machine; the upper bar is prevented from rising by the two vertical pieces, but has the liberty of moving backwards and forwards in the direction of its length, and is guided in such motion by laying half its thickness in a groove formed in the plate D. A rack, CC, fig 1, is fixed to the moving ruler, which engages in the teeth of the wheel B, mounted on an axis lying across at right angles to the ruler, and supported at its ends by two standards, rising up from the plate D.

On one end of the axis a handle is fixed for giving motion to the machine. Two blanks are put into the machine at the same time, as seen in the second figure, and the lower ruler can be made to approach nearer to, or recede farther from, the upper ruler, by the two screws, *ff*, to take in a different sized piece between them. The operation of the machine is very simple. Two blanks being placed between the edges of the rulers, the handle, A, is turned round half a turn, which moves the upper ruler endways, sufficient to mark the blank all round the edge. The two milled pieces are then taken out, and two other blanks are placed between the rulers: the handle, A, being turned half round in an opposite direction, carries the upper ruler back again to the position in which it first stood: thus two more blanks are milled, and so on. The machine is placed upon a strong wooden bench, to raise it to a convenient height for the man who turns the handle; the blanks are placed in the machine by a boy, near to that where the handle is.

The third and fourth figures prefixed are farther illustrations of Bolton's cutting out press. Fig. 3 shows the manner of the horizontal wheel acting on the roller, F. It represents a horizontal plan of the upper part of the axis. S, fig. 3, is part of the rim of the large wheel, and T, one of the projecting cogs, which, when the wheel turns in the direction of the arrow, will take the roller F, at the end of the lever FD, and turn the lever round in that direction which will wind up the screw, and raise the punch out of the die. This action also draws a rod, H, which is connected with the lever, by a joint; the other end is connected with a bended lever, from the other end of which a

rod descends, and has a piston fixed to it.

Figure 4 is the catch. At K it is moveable on a joint, E, and is thrown upward by a spring, *k*. To this spring a cord, O, is fastened, and the lower end of the cord has a treadle fastened to it.

APPLE GATHERER.

SIR,—Every farmer knows how important sound fruit is to the manufacture of good cider; but, nevertheless, very little pains are taken to secure this quality. Ordinarily the apples are beat or shaken from the trees, and fall to the ground bruised and materially injured. If, when so collected, they be immediately ground, they do not yield as much juice as they would if carefully gathered, and suffered to sweat and mellow; and if they be kept only for a short time, the bruised apples in part rot or perish, and when worked yield less juice, and impart a bad flavour to the cider.

Now, all these results from bad management may be easily and cheaply obviated, by merely using a canvass funnel, sufficiently large to receive the fruit when perfectly ripe, as it is shaken off the trees

This funnel should be slit in one place from top to bottom, so as to allow of its adaptation to the object in view; when placed around the tree this slit should be laced up, and the outer part should be secured with small poles so as to allow the fruit, which falls within the funnel, to roll gently down in a heap at the trunk of the tree.

This contrivance would save much labour, and prevent the fruit from becoming injured.

A FARMER.

West-Chester, April 19th, 1825.

LEATHER BANDS.

It is somewhat singular, that the application of leathern bands to communicate motion from one part of machinery to another should till recently have been so confined in respect to capacity, more especially as their property has been known from time immemorial.

Power to almost any extent may be communicated through them, and to effect this object, it is only necessary to increase their width under a proper tension proportionately to the increment of the power required to be imparted. I do not recollect to have seen any formula on the resistance of bands, by which a comparison between their utility and toothed wheels may be estimated, and I have not time to investigate the subject, were I competent to the undertaking; but it is evident, *a priori*, that the friction must be very considerably diminished by the use of bands. By adopting them we get rid of the disagreeable noise which attends the movement of toothed machinery, and also save considerable expense in construction and repairs.

We have been led to these remarks from having understood that Messrs. Sellers & Pennock have applied a band of about a foot in breadth to propel a saw of the ordinary dimensions for sawing timber.

It answers extremely well, and I think the application discovers research and judgment that is highly worthy of imitation wherever circumstances will justify the innovotion on common practice.

CAREY.

TO CORRECT ACID CIDER.

SIR,—The farmer, if he is fond of good cider, and has been provident, will be likely, at this season, to have some on hand that is *tart or pricked*. This, from carelessness or want of correction, is frequently suffered to increase till it is converted into vinegar, to his own mortification and the disappointment of his neighbours; who, as friendly folk should do, like occasionally to taste of each others cups and talk of passing events.

Now, this acidity in cider, and in wine also, if not advanced too far, is easily got rid of without perceptibly altering their taste or injuring their quality. It is true, that all acidity in these liquors is formed at the expense of the spirit or alcohol which they

contain; and to make up for this loss, a very small portion of apple, rectified rye, or other spirit should be added; but this ought not to exceed two quarts to the barrel.

In the next place, limestone * or chalk should be added; but here the quantity can only be determined by the acid present, of which the operator or farmer must be his own judge; though a half pound will be sufficient for a barrel. The solution of lime (acetate of lime) thus formed in the liquor is slightly bitter and purgative, but the quantity contained in a quart measure of it would not operate perceptibly, nor would its taste be observed. Should its use however, be objected to, skimmed milk may be very well substituted for it, although it will reduce its strength still more considerably, because the spirit, as well as the acid, forms a coagulum when present with albumen.

It is needless to remark, that before these additions are made, the liquor should be separated from its lees, and after they have been made, they should be closely stopped, and suffered to rest for a few days before use. Whenever the acidity has progressed so far that the addition of lime produces a perceptibly bitter taste, it has progressed too far to be corrected, and its acidulation should be promoted.

So far the cure has only been noticed; but the prevention is of still greater consequence, though I can hardly expect much pains will be taken to adopt it.

The most effectual way is by bottling; but this is too tedious and expensive for common use. This object may be well attained in two or three ways, the most simple of which is to put an ounce or two of fish or animal oil into the cask before it is broached; this will prevent the action of the atmospheric air on the liquor, which is the cause of acidity; or instead of oil some other air, as Hydrogen, Nitrogen, or the carbonic acid (which is much to be preferred) should be admitted to the cask from which the liquor may be required to be drawn. Various devices may be resorted to for the acquirement of this end; such as the attachment of a gasometer to the barrel by a pipe, &c.; but the mere hint is thought sufficient for the present purpose.

A FARMER.

West-Chester, May 1st, 1825.

* The acetate of lime is slightly bitter: it contains in one hundred parts, forty-seven parts acid, and fifty-three lime, the carbonic acid that will be disengaged will add briskness to the liquor, and cause it to drink more pleasantly.

IGNITION BY HYDROPHOSPHORIC GAS.

Mr. M. J. B. Von Mons has announced in the *Journal de Pharmacie*, that on kindling phosphuretted hydrogen, not spontaneously inflammable, the bubbles which were slowly generated, maintain the ignition of a lighted match without inflaming it, and were themselves inflamed by the incandescent flameless body. In the experiment of the philosophical candle, after the hydrogen has burnt for some minutes, the tube is made sufficiently hot to relight the gas immediately after blowing it out. Now M. Von Mons says, that the hydrogen of this candle inflames spontaneously if the mixture of the sulphuric acid and water be made in the bottle itself.

IMPROVED PERCUSSION PRIMERS.

REPORT

Of the Committee appointed by the Managers of the Franklin Institute, Philadelphia, to investigate the merits of, and advantages to be derived from, the use of Joshua Shaw's improved percussion primers, &c. &c.

These improved Primers are of two kinds; one is generally formed of copper, the other is a composition of pasteboard or other elastic substances. In each of these preparations there is deposited a small portion of any of the fulminating powders known to chemists, of which there are several kinds. Mr. Shaw exhibited two: one of them has been long in use, and composed of oxymuriate of potash, sulphur, charcoal, &c. &c.; the other is a later discovery, possessing qualities highly favourable to its universal application, as it is perfectly free from the liability to rust, which is produced by the use of the oxymuriate of potash, hitherto generally known and used, and applicable to either improvement.

The first of these improvements, and which has been patented in the United States, is so generally known, that our observations upon it are almost superfluous: suffice it to say, that, as far as our knowledge of it goes, it has given almost universal satisfaction, and

has been adopted by a great number of the most experienced shots in the country, who have uniformly recommended it to their friends, as a very valuable improvement, and perhaps the best extant at the time it was introduced; and its simplicity is such as to induce us to believe it is so nearly allied to perfection, that it will always divide the public patronage.

It has been applied upon some rifles by order of the authorities at Washington, where it has been tested more than a year, and no objections have at present been advanced. It is perfectly safe in regard to its use and application, and on this point we are more particular, because it has been reported to be liable to accidents; however, whether this be true or false, it is certain, that, under its present modifications, such a report must have been unfounded—an evil under which all useful improvements have uniformly laboured for a time.

There is, however, one objection which may be fairly urged against it, so long as the oxymuriate of potash shall be employed; but this objection is universal, and applies to every modification of the percussion principle, as it has been the only vehicle in use till within some few months, when a new discovery was made of a metallic preparation perfectly neutral, and, indeed, less corrosive than gunpowder itself; and of this Mr. Shaw has availed himself, so that this objection is now groundless, since the sportsman may take his own choice of either, and the difference of expense is trifling, compared with the advantages to be gained by it.

Mr. Shaw's second improvement is also very simple, and, in this respect, as well as two or three others, we think it preferable to the first. It consists of a piece of pasteboard, not a quarter of an inch in diameter, with a hole cut or pushed through it; and in this cavity the fulminating composition is placed, and there secured, by wax or other substances calculated to preserve it from injury, and by which it is rendered water-proof when required. This simple preparation constitutes the primer, which, when applied to use, is pressed by a small effort of the thumb or finger into a recess on the breech of the gun; immediately under the primer, and in the centre of this recess, is the touch-hole, which connects it with the magazine or charge in the gun. The cock of the lock is so contrived, that when the trigger is drawn is shall fall on the centre of the primer, and passing through the hole, or cavity, where the fulminating powder is deposited, causes it to explode, and forces it through the touch hole beneath it.

The first advantage which we shall notice in this improvement is, that it is not liable to be detached by any accident from the recess in which it is placed, nor is it liable to injury from any common pressure to which it might be subjected by carrying loose in the pocket, and may therefore always be relied on; and if oxymuriate of potash be used, it is less liable to injure the gun by rust, than it is when employed in any other way, as the paper absorbs a material portion of the pernicious refuse thrown off by the explosion, and the remainder escapes without settling upon the lock.

The next advantage which this improvement embraces is, that the primer is brought into closer contact with the charge or magazine, and may therefore be considered as being better also. Where arms are kept loaded for any length of time, with the intent of being used on sudden or unexpected attack, this primer is not subject to spoil, or contract rust or damp about the lock, and is as quick and as certain of fire, as if loaded and primed but five minutes before; and in nice shooting, particularly with respect to rifles, it appears to be entitled to a preference; and, in common with the first of these improvements, it will admit the cock to rest upon it with safety—an advantage calculated to prevent two-thirds of all the accidents attendant on field sports; and the sooner this improvement is known and brought into universal use the better, as it embraces every facility that can be required; and, combined with the use of metallic powder, as shown and exhibited to us, constitutes, in our opinion, the best possible means by which fowling-pieces can be discharged, and as worthy of the attention of the government, as it is of the public generally; and, in addition to our own opinion, we have the evidence of some experienced sportsmen who have tried it, and their testimony goes to confirm what we have here advanced in its behalf.

P. S. This last improvement of Mr. Shaw's was placed four minutes under water, and, notwithstanding, it exploded with as much vivacity as if nothing of the kind had taken place.

D. H. Mason
Isaiah Lukens
John S. Phillips

Philadelphia, 1st July, 1824.

CLEANING AND PRESERVING PICTURES.

Your Correspondent in a former No. wishes for a method of cleaning and preserving picture-frames. I must inform him, that when once the frames assume a dusky brown appearance, all the cleaning in the world will not bring back their former brilliant appearance; but they may be prevented from becoming brown, by coating them, when *new*, with any white spirit varnish, taking care to spread it lightly and thinly all over. This will reduce the brilliancy of the burnished parts a trifle, but then it will suffer no alteration afterwards; and the frames may at any time be cleaned with a sponge and cold water, and gently rubbed with a soft piece of wash-leather.

RELATIVE EFFECTS OF STEAM AND GUNPOWDER.

Sir,—Public attention having been directed to the ingenious Steam-gun of Mr. Perkins, a short inquiry into the relative effects of steam and gunpowder may not be unacceptable to some of your readers.

Before we conclude that a new engine of greater effect has been discovered for the destruction of our species, let us inquire into the nature of that which we possess, and I am satisfied we shall rise from the investigation startled with the prodigious power which we may carry in a goose-quill, rather than convinced that steam, in the state of the greatest elasticity in which we can use it, will ever rival a power which we may pronounce to be stupendous.

A series of well conducted and decisive experiments were made by Count Rumford, on the expansive force of fired gunpowder, a detailed account of which, together with engravings of the apparatus employed in so hazardous an undertaking, are to be found in the Philosophical Transactions for 1797: of the facts and the truth of the results, no shadow of doubt can exist, and they therefore deserve serious attention.

In these experiments the Count put the small quantity of twelve grains of gunpowder into an iron chamber, of which the bore was a quarter of an inch; weights were placed upon a valve closing the orifice; the powder was fired, and it was found to exert a force of 9431 atmospheres. Seventeen grains, when fired in a similar bore, could not raise a weight of 3081 lbs. placed on a valve which had an area of the twentieth part of a square inch; but eighteen grains raised that weight, and thus exerted a force equal to 10,977 atmospheres, or 165,000 lbs. on each square inch.

In these experiments the powder filled only about half the cavity; hence it expanded to double its bulk, and still exerted this amazing force; but when the whole cavity, equal only to one tenth of a square inch, was filled with twenty-six grains of powder (a quantity insufficient to charge a pocket pistol) the solid cylinder of hammered iron was burst asunder, though it was in every part an inch and a quarter thick, or five times the bore; to effect which would require a force equal to 54,750 atmospheres, or 410,624lbs. on the square inch. This latter result rests upon a calculation of the force requisite to burst an iron cylinder of the given dimensions.

I have examined that calculation, and belive it to be correct; but, whatever doubt may be entertained as to this fact, there can be none with regard to the former—for, in them, the power was estimated by the dead weight which the fired gunpowder actually lifted when placed over an orifice of a given size. In these we find a valve, the surface of which is but the twentieth part of a square inch, loaded with nearly four tons, and the elastic force overcomes and lifts it—a fact almost incredible; and, compared with which, the load on the valve of the highest pressure steam generator that ever was invented sinks into absolute insignificance.

It has been stated that from seven hundred to a thousand pounds per square inch is the elasticity of the steam used by Mr. Perkins in discharging pistol bullets.—These are fired, in rapid succession, from a single gun-barrel against a metal target, one hundred feet distant, and they are completely flattened on it; this, however, is not equal to the effect of a horse pistol, and it is much inferior to that produced by the discharge of a musket. The rapidity of the discharge is, however, to be considered; but, if we reflect that coals, water, pipes, a generator, and furnace, are all requisite to keep up the necessary supply of steam, we shall find that as much bulk and weight are attached to a single gun barrel as would equal that of a field-piece, which, in my opinion, would discharge more grape, and with infinitely greater force in a given time, than the whole of Mr. Perkins' apparatus.

The elastic force, indeed, of steam may be increased by an increased heat, and hence a greater power will be obtained: but, to effect this, there must be a proportionable increase of the size of the pipes, generator, furnace, &c., and this in a much greater degree than is usually supposed even by practical men. It is also to be kept in mind, that there is a limit to the expansibility of steam, which the nature of materials will not allow us to go beyond; and we may presume that no practical use will ever be made of steam beyond one or two thousand pounds on the square inch. Indeed, when we reflect that, at a temperature of seven hundred degrees Fahrenheit, steam only occupies four times the space of water, whilst, at a temperature of two hundred twelve degrees, it expands 18,000 times, we will discover another dif-

ficulty in the fact, that one quarter of the power generated would be required to force the water into the generator, which must be proportionably large to raise so much water to so high a temperature, and keep up that constant stream of it which is absolutely necessary for sustaining a continuous discharge of balls even from so small a bore as that of a gun barrel.—What then will we think of an attempt to apply steam to the discharge of ordnance? This, indeed, requires no serious attention, and it is my opinion, after a careful examination of the subject, that a twenty-four pounder steam-cannon, equally effective with our common guns of the same calibre never will be constructed—the thing is manifestly impossible.

I cannot, however, quit the subject without giving the inventor praise for his ingenuity: for, though it is unlikely to lead to any practical result, it furnishes an instructive and popular illustration both of the effect of steam and the power of the human mind.

A GUN-SPONGER.

CANAL TO CONNECT THE GULF OF MEXICO WITH THE ATLANTIC.

Sir—, I have recently seen a proposition, for uniting the Gulf of Florida to the Atlantic by means of a canal beginning at St. Mary's on the St. John's River and terminating at Vacassar Bay. The distance is computed at ninety miles. "There are two routes for the canal, one of which will require only *eighteen miles* of canal, and the other about *twelve* miles. The first and most approved rout commences in Vacassar Bay, which is bold and spacious and affords a good harbour and anchorage. In this Bay the River Suwannee empties, in which the navigation can be freely pursued until it branches into the Santa Fee—From thence into Orange Lake, across the Alauchua Tract into Orange Creek; from thence into the Ocklawaha and St. John's.

The distance of canalling, or rather in uniting the above navigable rivers by the foregoing rout is said to be but twelve miles. The other rout commences at the Anclote Keys, in the Gulf, and enters the Amaxura River; from thence into the Ocklawaha, into the St John's; distance about eighteen miles of canalling. The first route is most circuitous but it commences in a fine safe bay, and goes through a richer tract of country—the St John's River, is a plain, bold river, from the Alachua ferry.

From St. Mary's or Amelia Island to the Tortugas, the distance cannot be less than 4:0 or 500 miles, and after having doubled the Florida Keys, it is nearly the same distance to Vacassar Bay. A navigation therefore, of nearly 800 miles, always the most difficult and dangerous, is avoided by a short canal of 12 miles across Florida; and by thus uniting the rivers of that country, the trade is brought to St. Mary's or Amelia Island, where ships of any draught of water can repair. The cotton sugar, and other products of Louisiana and Alabama have a short and safe navigation in the Gulf of Mexico into Vacassar Bay, and in three days are transported by canal boats to the mouth of the St. John's River, or St. Mary's, where vessels are in waiting.

It will immediately strike every person interested, as one of the most easy, cheap, and advantageous projects ever attempted—it will shorten the voyage to New-Orleans—it will curtail the dangers of navigation, and be a protection against Pirates—it will greatly enhance the value and importance of Florida, and the attention of Government should be immediately directed to that quarter, and to that project"

In giving currency to the foregoing extract, I do not subscribe to all the opinions it contains; but, in the main, the subject merits the deepest consideration.

The reasons above urged are in themselves sufficiently important to warrant the completion of the measure; indeed I believe the property lost on the Bahama banks would amount annually to more than the interest of the requisite capital; besides, the number of lives sacrificed by this navigation is astonishingly great. But there are still stronger reasons why this object should be effected. They are of a political character, and involve the peace, and perhaps the prosperity and happiness of the nation.

Cuba is the key of the eastward pass to the gulf of Mexico; this pass is the main channel of intercourse between various parts of our maritime frontiers; and Cuba belongs to a foreign nation; feeble at present, it is true, but she may become strong, or Cuba may change masters, or it may become independent. In either of these cases, it might do us a moral wrong, and produce the results above stated. We might attempt to right ourselves; but a question involving so great and wide interest as that of possession, could be neither speedily nor cheaply decided; and I think the construction of this canal calculated to change this otherwise possible train of events.—It is one of national moment as connected with our peaceful pursuits: and the benefits to be derived from it in war would be incalculably great. The canal, however, should be sufficiently large to admit the passage of our largest merchant vessels; for the loading and unloading of vessels, and the transportation of produce and merchandise in boats would be a great drawback to the plan.

The expense, as the country for the whole distance is remarkably level and low, would not be great, especially as the greatest portion of the work may be executed in the course of a few winters by the United States' troops, rewarded by extra pay for this extraordinary service.

HAMILTON.

New-York, March, 1825.

From the London Chemist.

ON MAKING BEER FROM POTATOES.

M. Dubrunfaut has lately published in the *Mem. de la Soc. Roy d'Agriculture*, an account of some experiments he has made on the fermentation of different substances. The following is worthy of our readers' attention.

"Wishing to ascertain exactly the action which is exercised on other vegetable matters in the state of fecula, when treated by maceration, he mixed five hundred *grammes* of the fecula of potatoes with an equal weight of cold water; to which he gradually added 3500 more of boiling water; when the whole mass formed a very homogeneous paste, at the temperature of fifty degrees of Reaumur, (124 Fahrenheit) In this state he added to it one hundred fifty *grammes* of ground barley malt, and stirred the whole well together for some minutes, in order to mix it thoroughly; he then left it at rest, in a stove heated to 50 degrees of Reaumur.—After some time the mass, which at first was solid and thick, was completely liquefied, its taste changed, and it had become saccharine. On being submitted to the vinous fermentation, with a little ale yeast previously added, it yielded, on distillation, 38 *centimetres* of excellent brandy at 19 degrees. M. Dubrunfaut thus decidedly ascertained the property possessed by the malted barley of rendering the fecula fluid and saccharine in the space of an hour.

Still, with a view of applying these principles in rural economy, the author extended his researches to the more simple and least expensive methods of employing them; and, in the end he effected the separation of the fecula of potatoes in a more convenient manner.

The potatoes being rasped, or grated, very fine, four hundred *grammes* of the pulp are thrown into a brewing tub with a double bottom; and, whilst the workmen stir and agitate it with rakes as much as possible, boiling water is poured upon it; and all the fecula is then converted into a paste. Twenty *kilogrammes* of finely ground malt are then added; and a small quantity of short wheaten straw may also be added with advantage. The whole becomes fluid and saccharine in the space of two hours.

The liquid is now drawn off, as in brewing, and conveyed to the fermenting tub: the remaining mass of pulp is then left to drain for some time; when a fresh quantity of water, at fifty degrees of Reaumur, is added, and the whole agitated as before.—The liquor is then again drawn off, and the pulp submitted to the action of a cylindrical press. In this manner the greatest quantity of fermentable matter is extracted from the

potatoes; the liquid is not accompanied with any kind of deposite injurious to the distillation; and 54 *litres* of brandy at 19 degrees, of an excellent taste, may be drawn off from it. The residuum may be eaten by animals.

This experiment proves, that by means of this change in the process, the product of brandy is greater, and it possesses a more agreeable flavour, than when the potatoes are reduced to pulp by means of steam and agitation. The matter introducedinto the alembic is perfectly fluid, and therefore presents no difficulty in distilling it; the manipulations are not more expensive nor complicated; and they may be effected by the common apparatus, which is a very great advantage."

The following is what this gentleman says on converting the fermented potatoes into beer:

"After having treated the fecula as before stated, he added hops to it, and concentrated the whole to six degrees of the aerometer: he then submitted the liquor to the fermentation, which when terminated, a most agreeable and vinous odour exhaled from it: after some days, it was put into bottles, when it terminated well, and greatly resembled the Paris beer.

"By fermenting the liquid without the addition of hops, and substituting the honey of Brittany in place of them, he obtained a beer which had the taste and all the qualities of the beer of Louvaine. But it is more particularly in the manufacturing of an economical beer, which is so useful to the numerous class of workmen employed in agriculture, that this invention is most valuable, for the potatoes and the barley used in this manufacture may be obtained every where; they are neither dear nor unwholesome; and it is not requisite to make a perfect beer of them, but merely to produce a light and refreshing drink, which neither requires boiling nor concentration.

"In order to do this, the liquid produced by the maceration may be diluted with a quantity of water, which may vary according to the alcoholic strength we wish to give the liquor; and which may then be fermented with a little yeast, or even with baker's leaven."

STONY CREEK COAL.

We are gratified to learn that the exertions of MR. BIRD & Co., in exploring the depths of the *third mountain* * for coal, have not been unavailing.

Although the fact, that this mountain did contain coal, had been known to many for some years back, yet no individual appeared willing to sustain the expense of a thorough research, until the gentleman whose name we have mentioned, determined to do it at all hazards.

The experiments were first made within a small distance of the river, and repeated successively higher up Stony creek valley, for about five miles, where the vein of coal was found of a sufficient thickness, at the depth of about ten feet from the surface of the earth, to warrant a continuance of their exertions. The neighbourhood of a rapid and never-failing creek to the mines will afford every facility to the transportation of the coal to the Susquehannah, from which point the towns and villages along its banks may be easily supplied, at a cost far less than the price of wood, and considerably less, we should suppose, than other coal transported from a greater distance.

This coal is considerably lighter, it is said, than any other kind of stone coal yet discovered in this state, is much dryer, and blazes freely and easily. It possesses very little sulphur, and is therefore not offensive to those using it; it contains a great deal of bitumen, and from its very superior qualities will, it is thought, in a short time supersede the use of all other coal for the purposes of smithing, where it can be conveniently obtained.

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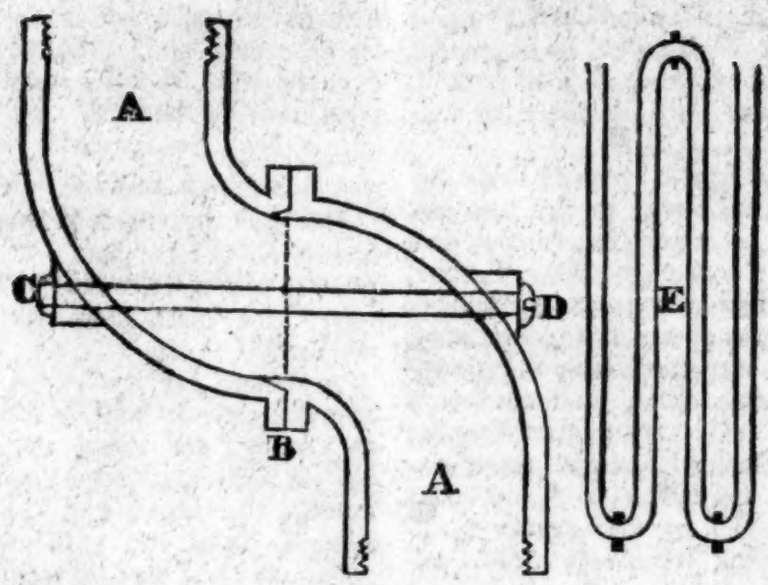
* Peter's Mountain, near Harrisburgh.—Dauphine Co. Pennsylvania.

METALLIC SUCTION PIPE.



Messrs. Sellers and Pennock, of Philadelphia, to whose genius and skill the public are greatly indebted for the numerous inventions and improvements they have made in matters intimately connected with the safety and comfort of society, have recently substituted metallic suction pipes for leather, in cases where they are required to supply fire engines from water sources below the level of the pumps.

The importance justly attached to this substitution consists in their perfect tightness by which a full and constant supply of water may at all times be commanded at any elevation equivalent to the pressure of the atmosphere, which, from liability to leakage, is not the case with leathern pipes.

The means those gentlemen have resorted to to accomplish this object are exceedingly simple, and by reference to the annexed diagram it will be perceived that the apparatus is equally portable and convenient.

Description.

AA, Represent a longitudinal section of the pipe at its joining, which is effected by the male and female parts being closely fitted by grinding, by the bolt C passing obliquely across it, and the nut D securing it in this situation.

B, Shows the adaption of the parts forming the rotary joint.

To these rotary joinings pieces of pipe of the same calibre, five or six feet in length, are attached by screws, as exhibited in the engraving. When put together in the folded form the figure E shows their continuous construction.

When we regard the inflexibility of all the metals as applicable to this purpose, we cannot but admire the simplicity of the contrivance, by which in this instance, they are made efficiently to surrender their claims to this peculiar character.—Ed.

STIRRUP LAMPS.

Much curiosity was excited about nine o'clock yesterday evening in the Strand, (London) by the appearance of a gentleman on horseback, from whose feet streams of light issued forth, and showed the pavement for several yards before and round the head of his horse, as clearly as in day time. He stopped at our office, and we found, on examination, that the light proceeded from a set of lamps, of his invention, one of which was fixed under each stirrup, and, having three sides darkened, emitted in front a blaze which was prevented by the rider's feet from rising to dazzle his eyes, and fell on the foreground with such power as to make every hollow or impediment visible, and render it as safe to ride in the darkest night as in the brightest noon.

The lamps are supplied with common oil, and so ingeniously arranged,

that the light is not affected in the least by the motion of the horse.—The gentleman, who left his name, Mr. Peat No. 167 Piccadilly, had just ridden from Romford, in Essex, to town, and his lamps were in as good order, and shone as brilliantly, as when he set out.

London Paper.

IMPROVED STEAM ENGINE.

Letters patent have been granted to George Vaughan, of Sheffield, (England) for an engine, by which power is gained and expense saved. The above engine is now brought to perfection, and is found to perform better than any other engine in speed, power, and saving of fuel: and more particularly as the engine is very much simplified, and friction reduced, it is likely to be one of the greatest improvements ever made in the steam engine, particularly as to the saving of fuel, and the gaining of power, as the engine only consumes half the coals of other engines and the power is gained by steam and the atmosphere being brought to act at one and the same time in conjunction with each other. The cylinder is only half the size of cylinders used in other engines, and is not half as weighty or bulky as other engines and only takes half so much room, makes double the number of strokes; and any engine may be altered to increase its power by taking away the cylinder, and having a smaller one on the improved principle, as the improvement is principally in the cylinder.

There are twelve pounds of steam, and fourteen pounds of atmosphere, both acting on the pistons in the cylinder at one and the same instant, that makes a pressure of twenty-six pounds on the inch on the pistons;—deduct six pounds for friction, there is then left a working power of twenty pounds on the inch on the pistons. This engine is particularly adapted for steam navigation, and must excel all others, and will be found to save itself, in a short time, in fuel and extra work.

London Paper.

[Isaiah Jennings constructed an engine on the foregoing principles, in the village of Greenwich, many years since, which performed well. Circumstances prevented him from prosecuting the improvement at that time; but he has for some months past been engaged on another, which promises fair, and will shortly be exhibited to the public.

N. York, May 5, 1825. ANON.]

From the Mechanics' Journal.

DEW.

Aristotle justly remarked, that dew appears only on calm and clear nights. Dr Wills shows that very little is ever deposited in opposite circumstances; and that little only when the clouds are very high. It is never seen on nights both cloudy and windy; and if in the course of the night the weather, from being serene, should become dark and stormy, dew which had been deposited will disappear

In calm weather, if the sky be partially covered with clouds, more dew will appear than if it were entirely uncovered.

I wish some person to explain the cause of the foregoing facts, in your Journal, so that they may be readily understood by an

UNLETTERED MAN.

WEIGHT OF METALS.

GENTLEMEN:

In answer to the question of your Correspondent J. A. respecting the weight of the different metals by their measure. I beg to say, that I am not aware of the existence of any tables such as he speaks of; but I enclose some extracts from a late publication (Professor Millington's Epitome of Philosophy,) which will, I dare say, answer his purpose, and if not too long for insertion, may be useful to many of your readers.

I am, gentlemen,

Yours obediently,

JOHN THOMPSON.

Page 161.—"From the circumstance of water being considered as unity in computing specific gravities, and from a cubic foot of water weighing 1,000 ounces avoirdupois, it follows, that the weight of any given quantity of material of which the specific gravity is known, may be easily computed; for the same figures that denote the specific gravity, also express the number of ounces, in a cube foot of the same substance; thus a cubic foot of Portland stone weighs 2,570 ounces, a cubic foot of lead 11,352 ounces, and one of naphtha 0,788 ounces."

At page 172 of the same work a table is given of the specific gravities of a great number of articles in common use; but as the inquiries of your Correspondent apply to the metals alone, I shall copy them only, although a general table of specific gravities would be highly useful to many of your readers.

Specific Gravities of the Metals.

Arsenic	5.763
Cast antimony	6.702
Cast zinc	7.190
Cast iron	7.207
Cast tin	7.291
Bar iron	7.788
Cast nickel	7.807
Cast cobalt	7.811
Hard steel	7.816
Soft steel	7.833
Cast brass	8.395
Cast copper	8.788
Cast bisumth	9.822
Pure cast silver	10.474
Same hammered	10.510
Cast lead	11.352
Mercury	13.568
Trinket gold	15.709
Gold coin	17.647
Pure cast gold	19.258
Same hammered	19.361
Pure platinum	19.500
Same hammered	20.336
Platinum wire	21.041
Platinum laminated, or beat into leaves	22.069

Each metal in the above table is lighter than that which follows it; and all metals become more dense or heavy by hammering.

Now, since the above table contains the specific gravities of all the metals, or the number of times that each of them is heavier than its own equal mass of pure rain water, and the numbers which express the specific gravity also denote the number of avoirdupois ounces that are contained in a cubic foot of any substance, it becomes very easy to calculate the weight of any mass of material, after having reduced it into cubic feet or inches; for since the cubic foot contains 1728 cubic inches, we have only to divide the specific gravity of any body by 1728 to get the weight of a cubic inch of that body. To obtain the cubic contents of a very irregular solid, plunge it into a vessel of any regular form, such as a cylinder or a cube previously filled with water, and on withdrawing it again, it will be found that a quantity of water has run over, which will be exactly equal to the magnitude of the body just immersed. The deficient quantity of water may be readily measured and reduced into cubic inches or feet, or the water that overflows may be caught and measured which will give the same result, without the necessity of providing a large vessel of a regular shape.

ARITHMETICAL PARADOX.

In an Arabian manuscript was found the following remarkable decision of a dispute:—Two Arabians sat down to dinner; one had five loaves, the other three. A stranger passing by, desired permission to eat with them, which they agreed to. The stranger dined, laid down eight pieces of money, and departed. The proprietor of the five loaves took up five pieces, and left three for the other, who objected, and insisted upon one half. The cause came on before Ali, the magistrate, who gave the following judgment.—"Let the owner of the five loaves, have seven pieces of money, and the owner of three loaves one." Query the justice of the sentence? Answer. Ali's sentence was just; for supposing each loaf divided into three equal parts, making twenty-four parts in all, the eight loaves and each person to eat an equal or one third part of the whole:—Therefore the stranger had seven parts of the person who contributed five loaves or fifteen parts: and only one of him who had contributed three loaves, which makes nine parts.

QUALITY OF BARK.

A German author, Dr. Michaelis has lately published the result of some experiments he made by means of muriatic acid, quick lime, and alcohol, to ascertain the quantity of *cinchonina* and *cinchona*, the active febrifuge principles contained in different species of bark. We are not quite sure that the specification of the different kinds will enable our readers to distinguish them, as English and Continental authors are not yet agreed on the names of the different kinds of bark; but still, as the estimate may be of some use, we shall transcribe it.

One pound weight of	Cinchonina	Cinchona
China rubra gave	32 grs.	64 grs.
China loxa	18	8
China fusca	75	75
China fusca, superfine, of *Huamuco*, at 3 rix drs. the lb.	50	32
Do. do. at 2¾ rix dollars	74	28
China fusca, superfine, of *Huamalies*, at 2¼ rix drs.	0	12
Do. do at 1 rix dollar	48	28
Do. do. at 14 groschen	60	34
China fusca tenn. superfine	12	44
China fusca tenn. middle kind	12	80
China flava Carthagena	28	48
China regia, rolled		154
China regia, flat, not doubled		286

Whence the last, or the *China regia*, is recommended for Medicinal purposes.

SNUFF TAKING.

The Earl of Stanhope has the following remarks upon snuff taking:—"Every professed and incurable snuffer, by a moderate computation, takes one pinch every ten minutes. Every pinch taken with the splendid ceremony of the handkerchief, and other incidental circumstances connected with it, consumes a minute and a half out of every ten: this amounts to one day out of every ten, which makes thirty-six days and a half in the year; and if the practise is continued in the same proportion during *forty* years, two entire years will have been dedicated to the *tickling* of the nose, and two more to the *blowing* it.

The unavoidable expenses attending snuff-taking throughout the British empire, might constitute a fund to pay off the national debt. Will any of the calculating correspondents of the Mechanics' Magazine make the necessary calculations, that the matter may be brought before the Committee of *Ways and Means*, with that convenient speed which the payment of debt demands?

F

BLESSINGS OF SLEEP.

Animal existence is composed of slumber and action, and Divine wisdom has appropriated a season for each. An animal who required no rest, could always live in daylight. The animal, though delighting in action, and formed for exertion, must at the same time have its nature invigorated by sleep. The regular returns of day and night correspond to these animal demands.

Were the bustle, the labour, and the motion of human life upheld by the continued presence of light, sleep could not be enjoyed without being disturbed by noise, and without the expense of that time which the eagerness of private interest would not contentedly resign. It is, therefore, happy for the human race, that nature, by the very disposition of her elements, has imposed upon man, at moderate intervals, a general intermission of toils, occupations, and pursuit.

But it is not for man alone that night and sleep are ordained. Inferior, but less perverted natures taste its solace, and expect its return with greater exactness and advantage than man. Who can observe without admiration the satisfaction and regularity with which the greater part of the irrational world yield to this pleasing necessity, this grateful vicissitude? How comfortably the birds of the air address themselves to the repose of the evening; and with what alacrity do they resume the activity of day!

The constitution of animals susceptible of torpor bears a relation to winter, similar to that which sleep bears to night. Against not only the cold, but the want of food, which the approach of winter creates, the Preserver of the world has in many animals by their migration or by their torpor, provided for the continuation of their existence.

As an example from a thousand,—if the *bat* did not sleep during the winter, it must be starved to death, as the moths and flying insects upon which it feeds, totally disappear.

GOOD PRECEPT.

An excellent saying is ascribed to Aristippus, upon visiting the court of Dionysius. When the tyrant asked him why he visited his court, the reply was (and let it ever be impressed on the minds of my brother tradesmen) "*To give what I have, and to receive what I have not.*"

J. Y.

HOW TO WASH PRINTED CALICOS.

Use as little soap as possible, and not with hot water: put in a little potashes, and gently swill them, taking care not to rub the cloth too much; wring it out in cold spring water, and dry it in the open air. By this means many colours will be improved—all, indeed, but such as are mere water-colours, and of this kind good cloths are seldom printed.

POCKET GUIDE.

We have glanced over a small volume, entitled "A Pocket Guide for the Tourist and Traveller, along the line of the Canals, and the interior Commerce of the State of New-York, by Horatio Gates Spafford, L. L. D. Author of the Gazetteer of New-York." It contains valuable and well arranged information, particularly for voyagers along the line of our canals, and we would advise such to provide themselves with a copy before they commence their travels.

It may be had at T. & J. Swords's, No. 99 Pearl-street.

INQUIRIES.

If any one of your Correspondents would oblige you with the manner in which Soda Water is manufactured, in the large way, for sale, and give a description of the apparatus for combining the carbonic acid gas with the water, I should be gratified by seeing an account of it.

MEDICUS.

GENTLEMEN:—

I wish to know the best method of preparing parchment to receive either *common* or *Indian* ink and colour: the process should be simple, so as not to require much time in the preparation.

A CONSTANT READER.

Stepney.

GENTLEMEN:—

Will any of your intelligent Correspondents oblige me by pointing out the cheapest and simplest method of warming a large ground floor room, 72 feet by 24?

J. FITCH.

GENTLEMEN:—

Through the medium of your useful Magazine, I should feel obliged if any of your Correspondents would favour me with a receipt for making Tracing-paper, which shall be perfectly transparent, and always remain white, or if they would oblige me with the the quantities of the composition which is made from spirits of turpentine and bees'-wax.

I remain, gentlemen,

Yours, &c.

W. J,

Which is the best method of extracting grease from leaves of books? What sort of composition answers the best for preventing the damp striking through the soles of boots and shoes? When it is considered what ill effects the community suffer, as regards their health, from damp feet, I trust those who are in possession of a remedy will not hesitate to publish it.

AN ORIGINAL SUBSCRIBER.

What is the exact power in horses in my steam engine? The cylinder is 14 inches in diameter, length of stroke 2 feet 6 inches, making 44 double strokes or revolutions of the fly wheel per minute.

Yours, &c.

W.